The Philippines WAVES pilot ecosystem accounts

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Date: October 2015

WAVES

Wealth Accounting and the Valuation of Ecosystem Services
www.wavespartnership.org

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Philippines Ecosystem Accounting

Two sites with different characteristics:

Southern Palawan

Area with high biodiversity

Indigenous people

Tourism potential

Rapid land use change

Laguna Lake

Includes part of Metro Manila

Water resources highly important

Urban sprawl and land use change

Southern Palawan

Policy questions

How can economic development be promoted while maintaining natural resources?

How to come to effective land use planning including plantation development?

What are the impacts of mining including water pollution and how could these be addressed?

What is happening to biodiversity including coastal resources?

What is the importance of the ecosystem for indigenous people?

Laguna lake

Policy questions

How to deal with the flood risks posed by recurrent hurricanes?

What are fair prices to charge to users of the lake?

What is the water quality of the lake in relation to the uses of the lake?

How could water quality be improved?

The Authors, as facilitated by the World Bank

Laguna Lake:

Main author: Laguna Lake Development Authority, with support from the Department of Environment and Natural Resources.

Southern Palawan:

Department of Environment and Natural Resources and the Palawan Council for Sustainable Development; Forest Management Bureau.

Both reports:

Supported by the National Economic and Development Authority (NEDA), the Philippines Statistics Agency (PSA) and the National Mapping and Resource Information Authority (NAMRIA), the European Space Agency, national and international experts,

The process

Two Technical Working Groups of around 20 people each, working part-time;

Over a 20 months period;

Bi-annual technical workshops with (inter)-national experts;

Around 15 specific trainings / exchanges of experiences facilitated by national experts, on GIS, modelling, valuation, units, etc.

Review process of draft reports involving stakeholders (steering group), users and international experts.

Final report to be published in December 2015

The pilots have led to a number of useful lessons for developing the overall SEEA EEA framework.

Laguna Lake Ecosystem Account

Produced by Laguna Lake Development Authority, supported by World Bank

Set of indicators reflecting, e.g.:
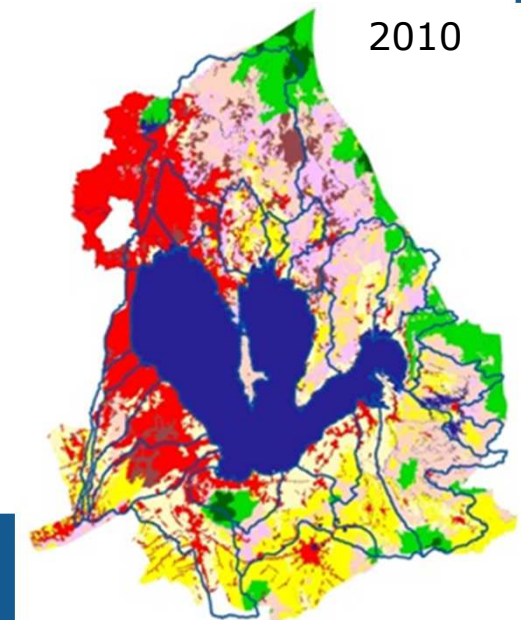
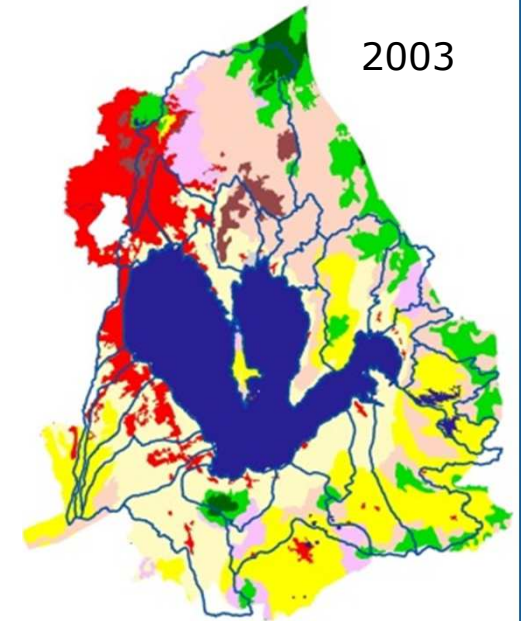Urban sprawl

Deforestation

Water quality

Water extraction

Fish production

Sedimentation

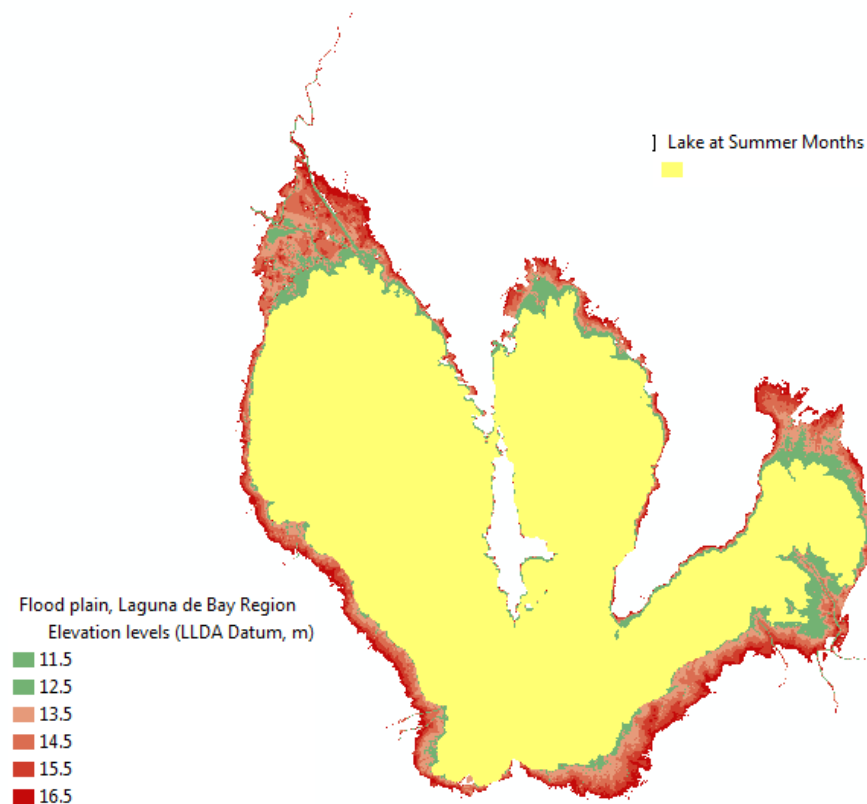People in flood risk zones

- **2014: 800,000 at 13.8m**

2003

2010

Fisheries in the lake

Aggregated table

2015	Hectares	Persons	Average resource rent per person (capture) or hectare (fish pens and cages) (1000 pesos)	Total resource rent for Laguna Lake (in million pesos per year)
Capture fisheries		31,000	134	4,154
Fishpens	8,097		138	1,117
Fishcages	3,988		134	534
Total	12,086			5,806

Detailed (spatial) analysis of flood risks

] Lake at Summer Months

Flood plain, Laguna de Bay Region
Elevation levels (LLDA Datum, m)
- 11.5
- 12.5
- 13.5
- 14.5
- 15.5
- 16.5

Information is available on flood risk zones, density of dwellings per zone, costs of floods, etc.

Priorities for erosion control

Laguna de Bay Sediment Loading

Legend
TSS ktons/ha/yr

TSS_kt_ha_
- 0-1
- 1-2
- 2 - 4
- 4 - 6
- 6- 10

0 5 10   20 Kilometers
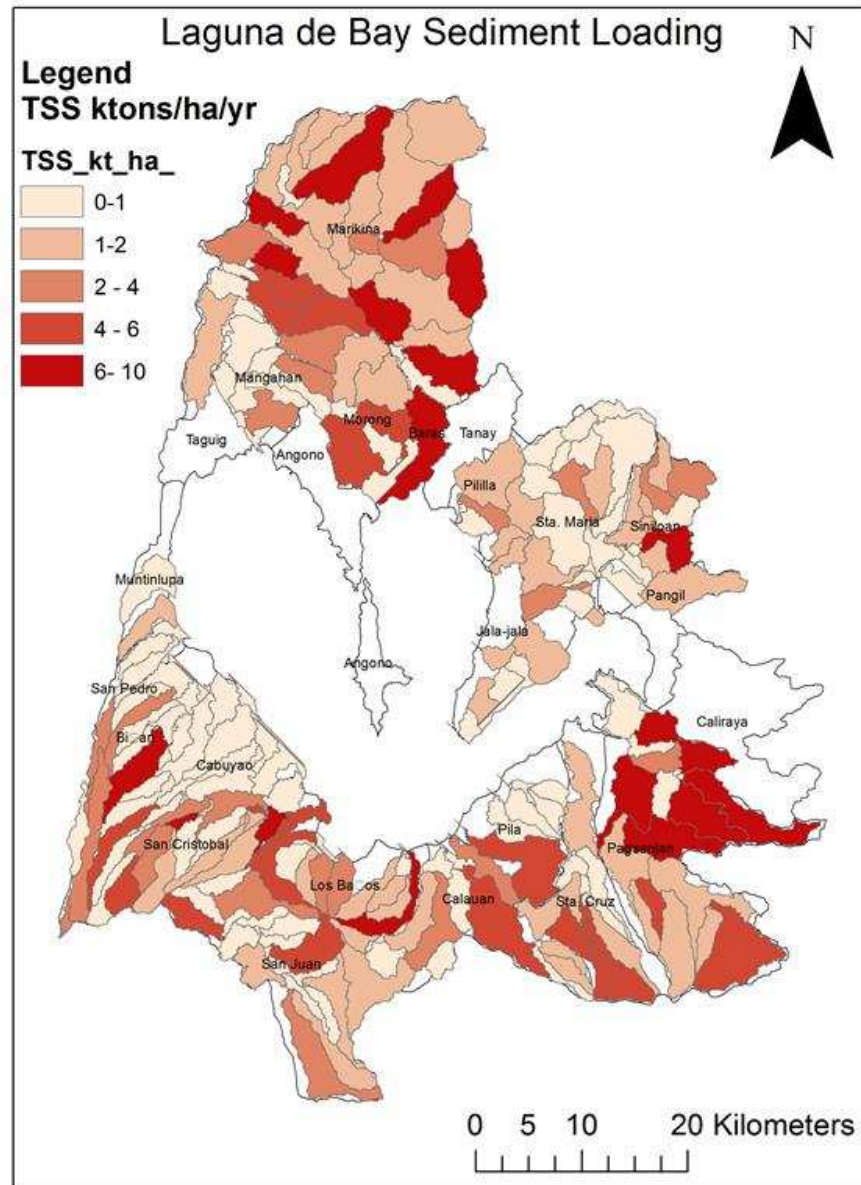
Summary account for Policy makers

	2001	2003	2010	2011	2012	2013	2014
Land account							
Annual cropland (1000 ha)							
Plantations (1000 ha)							
Closed forest cover (1000 ha)							
Open forest cover (1000 ha)							
Mangrove forest (1000 ha)							
Protected areas (1000 ha)							
- **Of which preserved as open or closed forest (1000 ha)**							
- **Of which degraded to shrublands or grasslands**							
- **Of which encroached by cropland or buildings (1000 ha)**							
Water Account							
Outflow through Pasig river (trillion l/year)							
Modelled water use of Laguna Lake by all sectors billion l/year)							
Ecosystem Condition Account							
Households connected to sewage system (%)							
BOD generated by households in tons per year (1000 ton/year)							
Total BOD loading in the lake (1000 ton/year)							
Water quality in the lake compared to legal requirements (% sample stations with water quality level 'A or B')[1]							
Sediment inflow in the lake (ton of sediment)							
Ecosystem Service Supply and Use Account							
Fish production from capture fisheries and aquaculture:							
Value of fish production (billion pesos per year)[2]							
- **of which ecosystem contribution (resource rent generated, billion pesos per year)[3]**							
Number of households in the 13.8m water level (x 1000)							
Sediment control by vegetation (ton of							

Policy applications Laguna Lake

As discussed during a stakeholders workshop and meetings with senior policy makers

- Supporting land use planning

- Support for flood risk management

- Support for water management including pricing of water use

- Better understanding of fisheries, e.g. managing aquaculture operators

Next steps Laguna Lake

Ecosystem accounting team set up

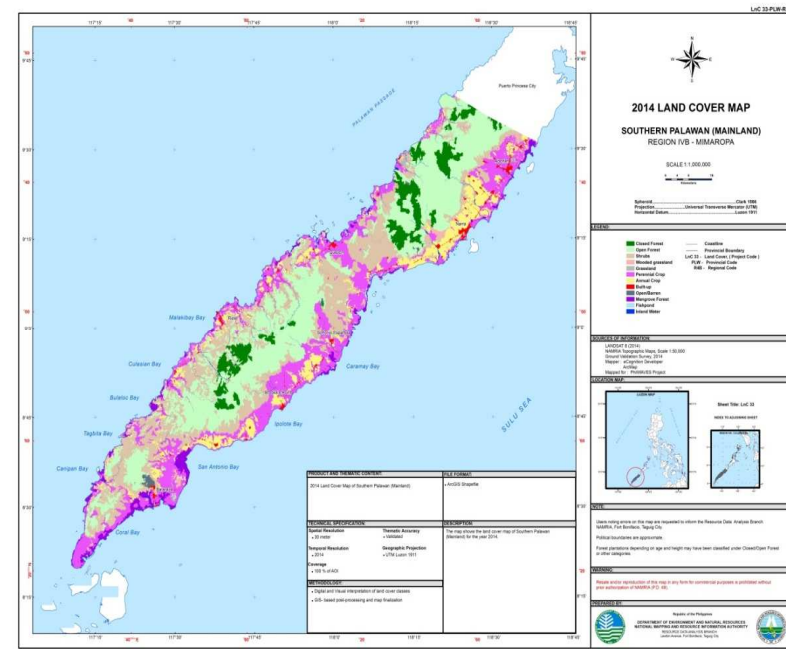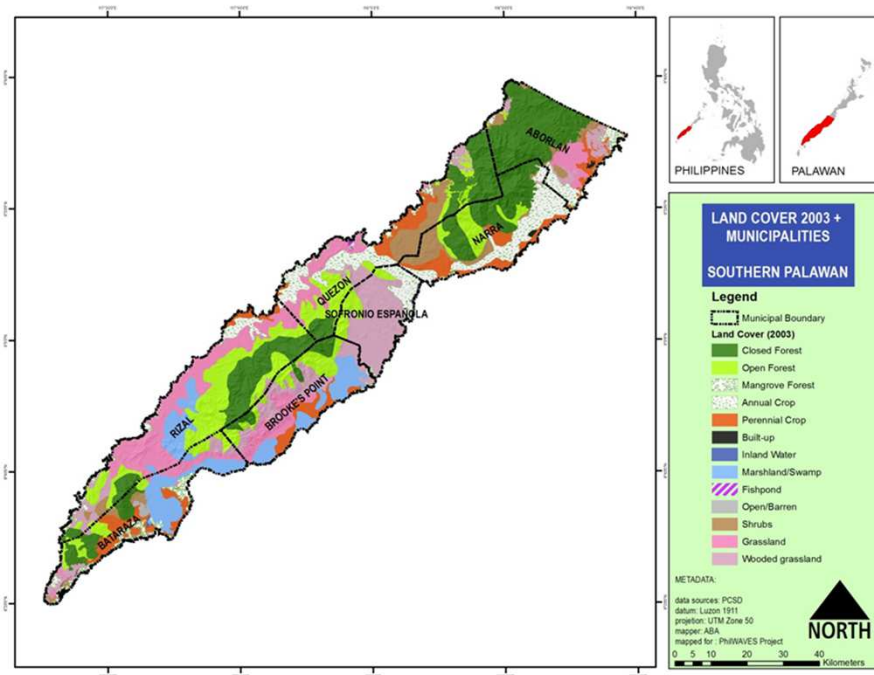Policy scenarios for further analysis have been developed

Connection to new hydrological model explored

Discussions ongoing on regular updates of parts of the account

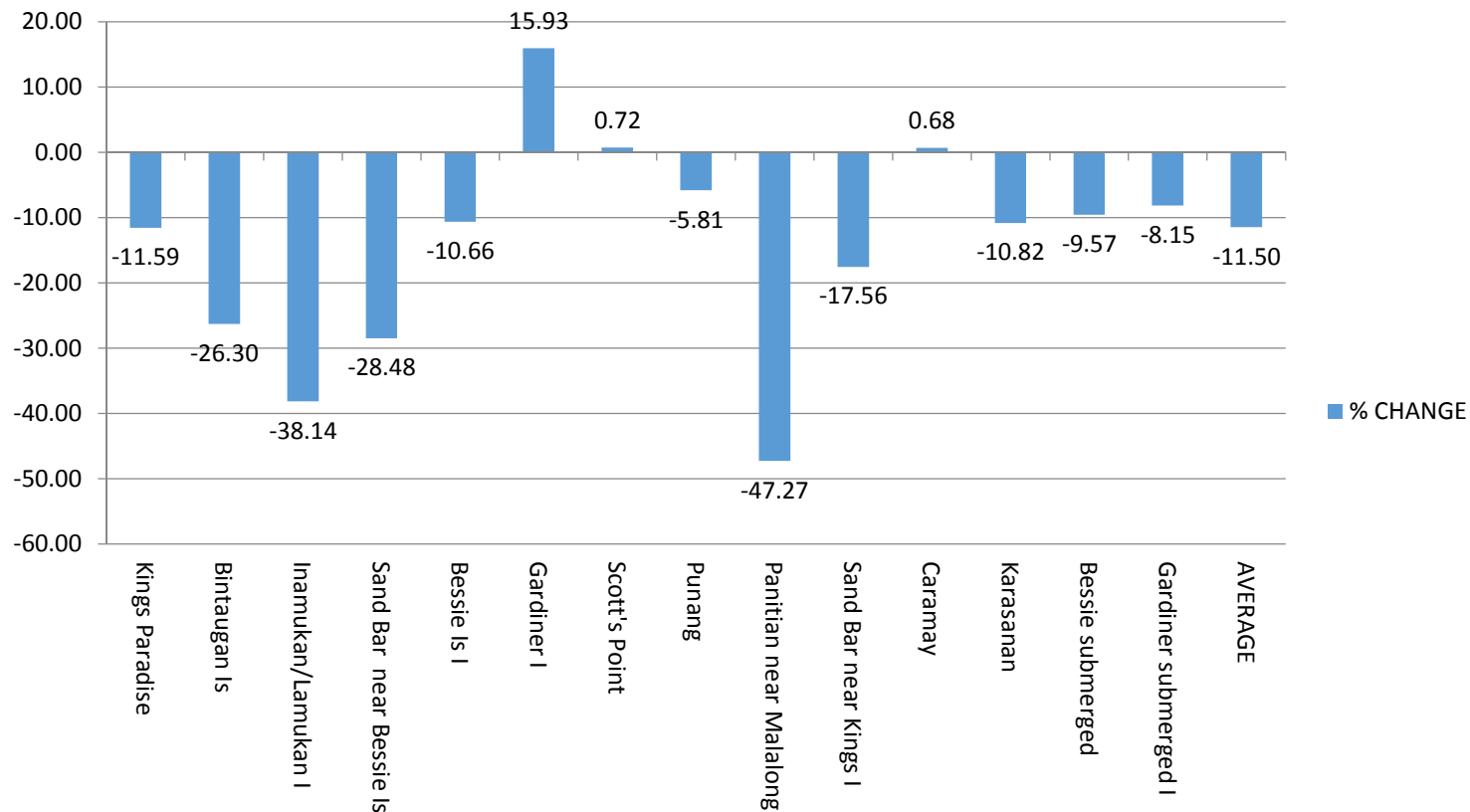Need to reach out to local authorities responsible for land use planning

Outcomes Palawan: land account

Comparison of 2003 and 2014 land cover shows substantial deforestation

Outcomes: Ecosystem Condition

Ecosystem condition account shows degradation of coastal ecosystems including coral and mangroves (Figure: changes in percent live coral, 2001-2010)

Carbon account: shows changes in carbon stocks

Carbon stock (table) and carbon flow accounts produced for 2003, 2010 and 2014

Ecosystem unit	2003			2010			2014		
	Area (ha)	Carbon stock (in tons C per ha)	Carbon stock (in million ton C)	Area (ha)	Carbon stock (in tons C per ha)	Carbon stock (in million ton C)	Area (ha)	Carbon stock (in tons C per ha)	Carbon stock (in million ton C)
Closed Forest	130,121	68.25	8.88	28,025	68.25	1.91	33,206	68.25	2.27
Open Forest	305,086	17.15	5.23	334,713	17.15	5.74	322,817	17.15	5.54
Mangrove Forest	16,297	93.12	1.52	17,020	93.12	1.58	17,054	93.12	1.59
Total	451,504		15.63	379,758		9.24	373,077		9.39

Ecosystem services supply account
Physical and monetary supply accounts developed for 2014

Ecosystem Units	Area	Production Costs per hectare				Yield	Farm-Gate Price	Resource Rent/ha	Resource Rent, Pulot Watershed
		Intermediate Consumption	Compensation to Employees	Taxes and Subsidies	User Costs of Produced Assets				
	(ha)	(Pesos)	(Pesos)	(Pesos)	(Pesos)	(ton/ha)	(Pesos/ kg)	(Pesos)	(million Pesos)
Annual Crop Ecosystem, Rice and Corn									
Rainfed Rice									
Irrigated Rice (paddy-paddy)									
1st Cropping									
2nd Cropping									
Irrigated Rice (paddy-corn-paddy)									
Yellow Corn									
White Corn									
Coconut									
Oil Palm									

Southern Palawan Ecosystem Account

Produced by Palawan Council for Sustainable Development and Department of Environment and Natural Resources

Set of indicators reflecting, e.g.:
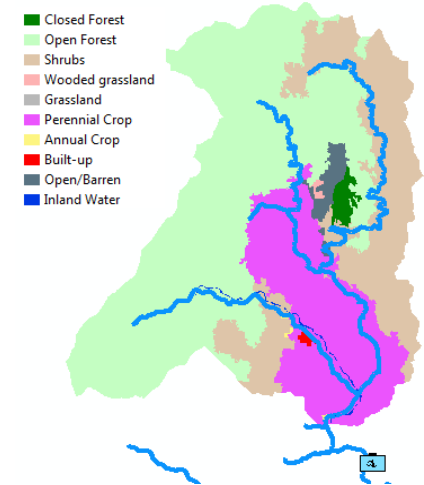
Forest cover

Plantation

Water quality

Coral reef and mangrove condition

Crop production (oil palm, rice)

Water regulation by forests

Cropping system	Irrigated area current forest cover (ha)	Resource rent (million pesos)	Irrigated area if forest is lost (ha)	Resource rent (million pesos)
Irrigated system				
- First crop	418	9.7	375	8.7
- Second crop	201	4.2	141	2.9
Total	619	13.9	516	11.6

Summary account for policy makers

	2001	2003	2010	2011	2013	2014
Land account (Southern Palawan)						
Annual cropland (1000 ha)						
Plantations (1000 ha)						
Closed forest cover (1000 ha)						
Open forest and grasslands (1000 ha)						
Mangrove forest (1000 ha)						
Carbon account **(Southern Palawan)**						
Carbon storage (million ton C)						
Carbon account **(Pulot watershed)**						
Carbon storage (million ton C)						
Ecosystem condition account (Pulot watershed and adjacent coastal zone)						
Pollution loading: annual average nickel concentration in 9 sample points (mg/l) [1]						
Pollution loading: annual average copper concentration in 9 sample points (mg/l) [1]						
Pollution loading: annual average suspended sediments in 9 sample points (mg/l) [1]						
Coral reef condition: average coral reef condition (% live coral cover in 26 sample points)						
Seagrass condition (% cover in sample sites)						
Mangrove condition (volume of trees, in 100 m3)						
Ecosystem Service Supply and Use Account (Pulot watershed)						
Paddy production (ton rice/year)						
Corn production (ton corn/year)						
Coconut production (ton copra/year)						
Oil palm fruit production (ton fresh fruit/year)						
Water regulation by forests (water available for irrigation during paddy growing seasons) (1000 m³ water/year)						
Fish production (ton/year)						
Ecosystem Asset Account (Pulot watershed) – NPV at 10% discount rate						
Cropland (million pesos)						
- Irrigated paddy fields						
- Coconut plantations						

Policy applications Palawan

As discussed during two stakeholders workshops and meetings with senior policy makers

- **Supporting land use planning**
- **Support for selection of plantation crops**
- **Support for prioritising safeguarding marine resources**
- **Support for water management (including new, ambitious water supply system)**
- **Identifying opportunities for ecotourism**

Next steps Palawan

PCSD has formed a 3 staff unit on Ecosystem Accounting

Agreement on policy scenarios to be analysed

Scaling up to the whole of Palawan under discussion

Possibilities to provide inputs to new land use plan for Palawan

Scaling up and linking to policies

Scaling up to the national level is being considered by key national stakeholders (e.g. NEDA, DENR, PSA, NAMRIA and presidential advisor on environment) in order to better link to national policies and achieve economies of scale.

Scaling up the whole of Palawan is considered in view of extended policy applications (land and water use planning, monitoring and enforcement)

Continuation and enhancement of work in Laguna Lake

Future work should be much more cost-effective now that methods have been designed and staff has been trained.

Success factors / Lessons learned

KEY: The ecosystem accounts are developed by national/local institutes supported by national (and to a degree international) experts

It takes time to develop the accounts in order to collect data from broad range of institutes, build capacities, do additional analysis and some modelling, and carry out the work

Strong government ownership and robust participatory and consultative process are required

An important element in the above is the communication strategy that keeps the data producers and data users engaged

Thank you

Phil WAVES:

http://www.wavespartnership.org/en/philippines

Laguna Bay Basin:

http://www.wavespartnership.org/sites/waves/files/images/Policy%20Brief_Philippines%20Laguna%20de%20Bay%20Basin.pdf

Southern Palawan:

http://www.wavespartnership.org/sites/waves/files/images/Policy%20Brief_Philippines%20Southern%20Palawan.pdf